



LONE STAR CIRCUITS

2019 Capabilities



Materials

Standard FR4	32 layers
Isola FR185,FR406,370HR,IS410,IS415,FR408,FR408HR	32 layers
ITEQ IT-180A	32 layers
Nelco 4000-29, 4000-13, 4000-13SI, 4000-13EP, 4000-13EPSI, N5000	28 layers
Nelco 9000 Series (PTFE)	8 layers
GETEK	12 layers
Polyimide	28 layers
Panasonic Megtron 6, Megtron 4	32 layers
Taconic RF-35, TLT, TLX, TLY, TSM30, Fastrise	16
Arlon 85N, 35N, 25N, 933, 870, 527, 522, AD, CLTE, CUCLAD, DICLAD, GX, GY, LX	28 layers
Rogers 4000 Series	16
Rogers 3000, 5000, and 6000 Series	8 layers
Rogers TMM6, TMM10, and ULTRALAM	8 layers
Rogers 2929 Bondply	Yes
Integral Technologies Zeta Lam SE (number of stacked vias)	2
Bergquest	Yes
Rohacell Foam	Yes
Maximum Useable Area (for 16" x 18" panel)	14.7 x 16.7"
Maximum Useable Area (for 18" x 24" panel)	16.7 x 22.7"
Maximum Useable Area (for 21" x 24" panel)	19.7 x 22.7"
Maximum Useable Area (for 24" x 28" panel)	22.7 x 26.7"
Custom Oversized Panel Sizes	Available (Autoclave Processing)

Stackups

Overall Board Thickness	.006 - .250"
< 0.020" Overall Board Thickness Tolerance	+/- .002"
0.031" Overall Board Thickness Tolerance	+/- .003"
0.062" Overall Board Thickness Tolerance	+/- .006"
0.093" Overall Board Thickness Tolerance	+/- .009"
0.125" Overall Board Thickness Tolerance	+/- .012"
0.187" Overall Board Thickness Tolerance	+/- .018"
0.250" Overall Board Thickness Tolerance	+/- .025"
Thinnest Dielectric Finished	.002"
Thinnest Finished Overall Thickness	.010"
Thinnest Plated Core	.002"

Special Products/Unique Capabilities

In-House Bonded Heatsinks	Copper/Aluminum
In-House Metal-Backed	Copper/Aluminum/Brass
Advanced Cavity Constructions	Pre-Rout + Lamination
Heavy Copper	UL to 5 oz / Non-UL 10 oz
In-House High Aspect Ratio Via in Pad	12:1
Packages using Rohacell Foam	Up to 3" thick
In-House UV/CO2 Laser	Yes
Multilayer PTFE Constructions	High Temp Lamination



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Mechanical Capabilities

Primary Drilled Hole Location Tolerance to Datum (Hole) Zero (DTP)	.006"
2nd Drill Hole Location Tolerance to Datum Zero (DTP)	.006"
Minimum Clearance from Copper Conductor to Mechanical Drilled Hole	.008"
Minimum Clearance from Copper Conductor to a Laser Drilled Hole	.008"

Plated Through Hole Capabilities - Smallest Plated Through Hole Size with 0.001" Minimum Average Copper Requirement

Finished Panel Thickness < 0.020"	.004"
Finished Panel Thickness 0.031"	.004"
Finished Panel Thickness 0.062"	.005"
Finished Panel Thickness 0.093"	.008"
Finished Panel Thickness 0.125"	.010"
Finished Panel Thickness 0.187"	.016"
Finished Panel Thickness 0.250"	.020"
Plated Hole Size Tolerance	+/- .003"
Plated Hole Size Press Fit applications	+/- .002"
Aspect Ratio (with 0.008" drill)	12:1
Isolated Plated Hole Spacing Minimum (Drilled hole to hole)	.010"

Non Plated Through Holes

Smallest Non Plated Hole Size (Finished)	.006"
Largest Non-Plated Hole Size Routed	No limit
Non-plated Routed Hole Tolerance	+/- .005"
Minimum NPTH to Edge of Board Spacing	.010"

Blind/Buried Vias (Sequential Lamination)

Minimum FINISHED Via Hole Diameter - Epoxy Filled	.006"
Maximum FINISHED Via Hole Diameter - Epoxy Filled	.018"
Maximum Aspect Ratio for Epoxy Filled Via Holes	10:1
Available Epoxy Fill Types	San-Ei Kagaku, Taiyo, Peters
Laser Microvia (μVia) Capabilities	
Smallest (as ablated) Laser Via	.003"
Largest (as ablated) Laser Via	.008"
Via Aspect Ratio (Depth to Diameter)	1:1
Capture Pad Size	.010"
Target/Landing Pad Size	.010"
Number of Stacked Via Layers	3 Layers
Copper-Filled Microvia	Yes

Control Depth Drill and Backdrill Capabilities

Backdrill - PTH Stub Removal	+.010" over Plated Thru Hole Diameter
Minimum Backside Dielectric Separation	.003"
Control Depth Drill Depth Tolerance	+/- .0025"

Scoring Capabilities

Angles	20°, 30°, 45°
Offset Tolerance	.003"
Optimum Remaining Web Thickness	1/3 of thickness



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Remaining Web Tolerance	+/- .002"
True Position Tolerance	.005"
Edge Connector Bevel Capabilities	
Finger Tip Angle	20, 30, 45 degrees
Bevel Depth Tolerance	+/- 0.005"
Profile Capabilities	
Standard Router Bit Diameter	.093"
Routed Profile Tolerance	+/- .005"
Minimum Internal Rout Radius	.010"
Minimum Routed PTH Slot Width	.020"
Feature Size Capabilities - Innerlayer Capabilities - Minimum Conductor Width and Spacing	
Internal Starting Copper Weight 1/4 oz.	.003" Line - .003" Space
Internal Starting Copper Weight 1/2 oz.	.003" Line - .004" Space
Internal Starting Copper Weight 1 oz.	.003" Line - .005" Space
Internal Starting Copper Weight 2 oz.	.004" Line - .007" Space
Internal Starting Copper Weight 3 oz	.005" Line - .009" Space
Internal Starting Copper Weight 4 oz	.006" Line - .011" Space
Internal Starting Copper Weight 5 oz	.008" Line - .014" Space
Internal Starting Copper Weight 6 oz (Not UL Certified)	.010" Line - .016" Space
Feature Size Capabilities - Outerlayer Capabilities - Minimum Conductor Width and Spacing	
External Copper Finished Thickness 1.0 oz.	.003" Line - .003" Space
External Copper Finished Thickness 1.5 oz.	.003" Line - .005" Space
External Copper Finished Thickness 2.0 oz.	.004" Line - .006" Space
External Copper Finished Thickness 3.0 oz.	.005" Line - .009" Space
External Copper Finished Thickness 4.0 oz.	.006" Line - .011" Space
External Copper Finished Thickness 5.0 oz.	.008" Line - .014" Space
External Copper Finished Thickness 6.0 oz. (Not UL Certified)	.010" Line - .017" Space
External Copper Finished Thickness 7.0 oz. (Not UL Certified)	.012" Line - .019" Space
External Copper Finished Thickness 8.0 oz. (Not UL Certified)	.014" Line - .021" Space
Pad Diameter to Drilled Hole Size	
Component holes	Drill Size + .010"
Via holes	Drill Size + .010"
Pad Diameter to Laser Ablated Hole Size	Drill + .004"
Solder Mask	
Min. LPI Soldermask Clearance (LDI Imaged)	.0015"
Pad size larger than NPTH	.003"
Web Between Surface Mount Pads	.004"
Solder Mask Colors	Green, Red, Blue, Yellow, White, Black, Clear Custom
Solder Mask Type	Taiyo/ Electra/ Enthone
Solder Mask Type	LPI, LDI
Minimum Mask Defined Pad Diameter	.006"



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Silkscreen

LPI Legend Capability	Yes
Width LPI Legend	.003"
Screened/LPI Legend Colors	Green, Red, Blue, Yellow, White, Black

Via-in-Pad

Epoxy Filled – Non-Conductive	Yes
Epoxy Filled Thru Hole Capability	Yes
Epoxy Filled Thru Hole Minimum	.004"
Epoxy Filled Thru Hole Maximum	.018"
Minimum Board Thickness	.020"
Maximum Board Thickness	.125"
Via Fill Aspect Ratio	10:1
Conductive VIP Options	DuPont, Tatsuta
Non-Conductive VIP Options	Taiyo, San-Ei Kagaku, Peters

Copper Plated/ Filled

Copper Filled μ Via Process	Yes
Copper Filled μ Via Hole Minimum	.003"
Copper Filled μ Via Hole Maximum	.007"
Via Fill Aspect Ratio	.5:1

Military

Etch Back	Yes
IPC Class 3A Etchback Specification	Yes

Surface Finishes Options

Hot Air Solder Level (lead based)	Yes
Electroless Nickel Immersion Gold	Yes
Immersion Silver	Yes
OSP	Yes (Outsourced)
Electroless Nickel Electroless Palladium Immersion Gold (ENEPIG)	Yes (Outsourced)
Immersion Tin	Yes (Outsourced)
Full Body Gold	Yes
Bondable Gold	Yes
Plated Nickel	Yes
Electroless Nickel	Yes
Fused Tin Lead Reflow	Yes
Copper	Yes

Mixed Finishes

HASL with Selective Gold	Yes
Dual Gold Plating	Yes
Immersion Gold with Selective Hard Gold	Yes
Recessed Fingers	Yes

Testing Capabilities

Minimum Test Continuity Resistance	.5 Ohms
Maximum Test Voltage	250 Volts